

US009637010B2

(12) United States Patent

Merienne

(54) SYSTEM AND METHOD FOR SECURE CHARGING OF A MOTOR VEHICLE BATTERY

(71) Applicant: RENAULT s.a.s., Boulogne-billancourt

(FR)

(72) Inventor: Ludovic Merienne, Gif sur Yvette (FR)

(73) Assignee: **RENAULT s.a.s.**, Boulogne-billancourt

(FR)

(*) Notice: Subject to any disclaimer, the term of this

patent is extended or adjusted under 35

U.S.C. 154(b) by 183 days.

This patent is subject to a terminal dis-

claimer.

(21) Appl. No.: 14/401,436

(22) PCT Filed: May 16, 2013

(86) PCT No.: PCT/FR2013/051065

§ 371 (c)(1),

(2) Date: Nov. 14, 2014

(87) PCT Pub. No.: **WO2013/171431**

PCT Pub. Date: Nov. 21, 2013

(65) **Prior Publication Data**

US 2015/0077055 A1 Mar. 19, 2015

Related U.S. Application Data

(60) Provisional application No. 61/657,215, filed on Jun. 8, 2012.

(30) Foreign Application Priority Data

May 16, 2012 (FR) 12 54514

(51) **Int. Cl.** *H02J 7/00*

B60L 11/18

(2006.01) (2006.01)

(Continued)

(10) Patent No.:

US 9,637,010 B2

(45) Date of Patent:

*May 2, 2017

(52) U.S. Cl.

CPC **B60L 11/1809** (2013.01); **B60L 3/0069** (2013.01); **B60L 3/12** (2013.01);

(Continued)

(58) Field of Classification Search

CPC B60L 11/1809

(Continued)

(56) References Cited

U.S. PATENT DOCUMENTS

4,700,300	Α	*	10/1987	Schultz	G01V 5/101
					250/256
5,636,620	Α	*	6/1997	Kiess	F02P 17/12
					123/625

(Continued)

FOREIGN PATENT DOCUMENTS

CN 201508392 6/2010 WO 2011 112510 9/2011 (Continued)

OTHER PUBLICATIONS

International Search Report Issued Oct. 16, 2013 in PCT/FR13/051065 Filed May 16, 2013.

(Continued)

Primary Examiner — M'Baye Diao (74) Attorney, Agent, or Firm — Oblon, McClelland, Maier & Neustadt, L.L.P.

(57) ABSTRACT

A system and method for secure charging of a motor vehicle battery including the steps of secure charging of the battery of a motor vehicle from a network estimating the resistance between the earth and the neutral of the network, including at least one injection of pulses of current into the network, measurements of voltage between the earth and the neutral of the network in response to each pulse, and a determination of the earth resistance from the measured voltages. Each injection of current pulses into the network includes the (Continued)

